

**WHAT IS CLAIMED IS:**

1. A communication node system, which is for an Ethernet-PON (Passive Optical Network), the communication node system comprising:

an LLID register for storing an LLID (Logical Link Identification) being  
5 an allocated identifier;

a preamble generator for generating a PON preamble using the LLID;

a CRC (Cyclic Redundancy Check) generator for generating a CRC for  
the preamble;

a transmission connector for combining transport data with the CRC-  
10 including preamble to generate a transport frame, and forwarding the transport  
frame to the network;

a reception connector for receiving the frame from the network and  
dividing the received frame into a preamble and received data;

a filter for extracting an LLID from the preamble, comparing the  
15 extracted LLID with the LLID stored in the register, and selectively filtering the  
extracted LLID; and

a received frame generator for, based on the filtering result from the  
filter, discarding the received data, or combining the received data with the  
preamble to generate a received frame.

20  
2. The communication node system as claimed in claim 1, further  
comprising:

a CRC section for performing a CRC for the preamble divided from the  
received frame; and

a status counter register for storing the CRC result of the CRC section.

3. The communication node system as claimed in claim 2, further comprising:

5 a shift register for temporarily storing the received data during the CRC for the preamble.

4. The communication node system as claimed in claim 1, wherein the filter determines that the received frame is forwarded to itself, and performs a  
10 success operation on the received frame, when the extracted LLID is a broadcast LLID and is identical to the LLID stored in the LLID register.

5. The communication node system as claimed in claim 1, wherein the filter determines that the received frame is forwarded to itself, and performs a  
15 success operation on the received frame, when the extracted LLID is an anti-LLID and the predetermined lower bits of the LLID stored in the LLID register are identical to the predetermined lower bits of the extracted LLID.

6. The communication node system as claimed in claim 5, wherein the  
20 filter discards the received frame when the extracted LLID is an anti-LLID and the predetermined lower bits of the LLID stored in the LLID register are not identical to the predetermined lower bits of the extracted LLID.

7. The communication node system as claimed in claim 1, wherein the

preamble comprises a 2-byte SFD (Start Frame Delimeter), a 3-byte reserved word, a 2-byte LLID, and a 1-byte CRC.

8. The communication node system as claimed in claim 1, wherein the  
5 CRC generator generates a CRC for the preamble using a CRC-8.

9. A control node system, which is for data communication between a plurality of communication node systems in an Ethernet-PON (Passive Optical Network), the control node system comprising:

10 an LLID (Logical Link Identification) register for storing LLIDs being identifiers allocated to the plural communication node systems connected to the network;

a preamble generator for generating a PON preamble based on an LLID of a destination communication node system, when sending transport  
15 data supplied from an originating communication node system to the destination communication node system via the network;

a CRC (Cyclic Redundancy Check) generator for generating a CRC for the preamble;

a transmission connector for combining the transport data with the  
20 CRC-including preamble to generate a transport preamble, and forwarding the transport preamble to the network, thereby causing the network to forward the transport preamble to the destination communication node system;

a reception connector for receiving a frame from the originating communication node system via the network, and dividing the received frame

into a preamble and received data;

a filter for extracting the LLID from the preamble, and comparing the extracted LLID with the LLID stored in the LLID register to determine whether or not the received frame is transferred from a controllable communication node system; and

a received frame generator for combining the received data with the preamble to generate a received frame based on the filtering result of the filter.

10. The control node system as claimed in claim 9, wherein the filter discards the received frame when the lookup for the LLID register shows that the LLID extracted from the preamble of the received frame is not present in the LLID register.

11. The control node system as claimed in claim 10, wherein the received frame generator combines the received data with the preamble to generate a combined frame, generates an interval signal representing an interval of the received data, and forwards the generated interval signal together with the combined frame.

12. The control node system as claimed in claim 10, further comprising:  
a status counter register for storing the lookup result of the filter,  
the control node system increasing an error count value of the status counter register by “1” to determine whether or not the LLID of the received frame has an error, when the LLID extracted from the preamble of the received

frame is not present in the LLID register.

13. The control node system as claimed in claim 9, wherein the LLID register comprises as many 16-bit registers as there are communication node systems connected to the network.

14. The control node system as claimed in claim 13, wherein the LLID register has a value of "FFFF" and stores an input LLID value with a message in a power-on state.

15. A communication system, which is for an Ethernet-PON (Passive Optical Network), the communication system comprising:

at least one communication node system including a first LLID (Logical Link Identification) register for storing an LLID as an allocated identifier, a first preamble generator for generating a PON preamble using the LLID, a first CRC generator for generating a CRC for the preamble, and a first transmission connector for combining transport data with the CRC-including preamble to generate a transport frame and forwarding the transport frame to the network; and

a control node system including a second LLID register for storing LLIDs as an identifier allocated to the plural communication node systems connected to the network, a first reception connector for receiving a frame from the communication node system via the network and dividing the received frame into a preamble and received data, a first filter for extracting the LLID

value from the preamble and comparing the extracted LLID with the LLID stored in the first LLID register to determine whether or not the received frame is transferred from a controllable communication node system, a first received frame generator for combining the received data with the preamble to generate  
5 a received frame based on the filtering result of the first filter, a second preamble generator for receiving transport data to be transmitted to one communication node system and generating a PON preamble based on the LLID of the destination communication node system of the transport data, a second CRC generator for generating a CRC for the preamble, and a second  
10 transmission connector for combining the transport data with the CRC-including preamble to generate a transport frame and forwarding the generated transport frame to the network, thereby causing the network to forward the transport frame to the destination communication node system.

15 16. The communication system as claimed in claim 15, wherein the communication node system further comprises:

a second reception connector for receiving a frame from the network and dividing the received frame into a preamble and received data;

a second filter for extracting an LLID value from the preamble and  
20 comparing the extracted LLID with the LLID stored in the first LLID register to selectively filter the extracted LLID; and

a received frame generator for, based on the filtering result of the second filter, discarding the received data or combining the received data with the preamble to generate a received frame.